

A NEW SPECIES OF GARDEN EEL FROM THE EASTERN PACIFIC WITH COMMENTS ON *HETEROCONGER DIGUETI* (PELLEGRIN) AND RELATED NOMINAL SPECIES

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ABSTRACT

Heteroconger pellegrini n.sp. (Anguilliformes, Congridae, Heterocongrinae) is described from 33 specimens 155–626 mm TL collected in the Gulf of California and Pacific Costa Rica. The species is distinct from its nominal eastern Pacific congeners in having more or less plain overall body color formed from minute, close-set black speckles, a very slender body and 177–192 vertebrae. In *H. digueti* (Pellegrin), *H. canabus* (Cowan and Rosenblatt) and *H. klausewitzii* (Eibl-Eibesfeldt and Köster) the body is tan to dark chocolate color interrupted by white patches anteriorly, the pectoral fin and inner face of the gill opening are very dark brown, and there are different vertebral numbers. In body color the new species closely resembles *Gorgasia punctata* Meek and Hildebrand, though this is generically distinct in several external features and has 147–157 vertebrae. The smaller of the two syntypes of *H. digueti* from the Gulf of California is actually *H. pellegrini*. The larger syntype, designated here as the lectotype of *H. digueti*, is shown to have a regrown hypural complex and has probably lost 10–12 or more vertebrae. That, and other information on vertebral numbers, has implications for the way in which the species of the “digueti” type are viewed.

The garden eels comprise a distinctive group of tropical to subtropical shallow-water eels known from all major oceans. Two genera are currently recognized: *Heteroconger* Bleeker, 1868 and *Gorgasia* Meek and Hildebrand, 1923. The species of *Heteroconger* have a very foreshortened snout and jaws, an upper lip continuous with the lip of the opposite side across the face of the snout and together enveloping the anterior nostril tubes, and a reduced complement of head pores. The species of *Gorgasia* have a somewhat longer snout and jaws, upper lip separated from its neighbour medially and not enclosing the anterior nostrils, and a more complete cephalic pore system.

About 35 species of heterocongrine congrid eels are currently known. There are at least two in the Atlantic and 30 in the Indo-west Pacific, including several undescribed species. In the eastern Pacific, *Heteroconger digueti* (Pellegrin, 1923) and *Gorgasia punctata* Meek and Hildebrand, 1923 were coincidentally described in the same year from Baja California and Pacific Panama respectively. Subsequently, *H. herrei* (Wade, 1946) and *H. canabus* (Cowan and Rosenblatt, 1974) were described from Baja California and *H. klausewitzii* (Eibl-Eibesfeldt and Köster, 1983) from the Galápagos. Cowan and Rosenblatt (1974) synonymised *H. herrei* with *H. digueti*.

In addition to the morphological features described above that distinguish the *Heteroconger* species from *Gorgasia punctata*, this species has a distinctive body coloration of close-set spots and speckles, as suggested by the specific name. The three currently recognised eastern Pacific species of *Heteroconger*, in contrast, all have tan to dark chocolate body color that may be variously interrupted by lighter patches, especially on the head. The head and lateral line pores are surrounded to a greater or lesser degree by light-colored areas or halos. More obviously, the pectoral fin and the area in front of its base are very dark brown to black, and there are dusky areas on the upper and lower lips.

Until recently it had been assumed that *G. punctata*, together with the three species of *Heteroconger*, i.e., *H. digueti*, *H. canabus* and *H. klausewitzii*, com-

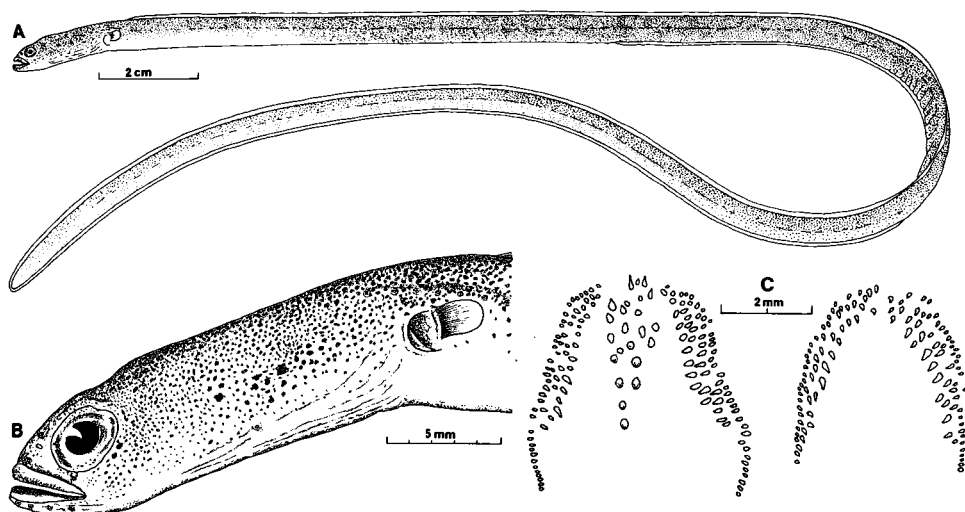


Figure 1. Holotype of *Heteroconger pellegrini*, LACM 32558-5, 400 mm TL, Isla del Caño, Costa Rica. (A) Whole animal. (B) Head region to show details of pigmentation. (C) Upper (left) and lower (right) dentition as taken from plasticine impressions.

prised the *Heterocongrinae* in the eastern Pacific. However, collections of fishes made there in 1990 and reported by Allen and Robertson (1994) revealed the existence of an undescribed species of *Heteroconger*, distinct in its body coloration from its congeners but in that respect remarkably like *G. punctata*. My interest in the garden eels prompted me to follow up this information and David G. Smith reported that three specimens of the undescribed species had been deposited in the United States National Museum. Many further specimens came to light when I had occasion to refer for comparative purposes to a labelled sample of *G. punctata* from Pacific Costa Rica in the Los Angeles County Museum of Natural History. This proved not to be that species but a *Heteroconger* quite different in body coloration from *H. digueti* and its eastern Pacific congeners. The many specimens in this Costa Rica sample are profusely and uniformly speckled with minute, closely-set black pigment spots so as to give these eels an overall dark appearance, though lighter below. In this way they do indeed resemble *G. punctata* except that in that species the melanophores tend to be aggregated into larger, evenly-spaced and more clearly defined dark spots.

The discovery of the LACM specimens led me to refer to the descriptions and types of *H. digueti* (Pellegrin, 1923a, 1923b). In those original accounts the species was described as having a general body color of "uniformement brunâtre", i.e., uniform brownish. The new species could therefore have been indicated, rather than any of the *Heteroconger* species with dark body color, dark pectoral and anterior white patches. Pellegrin's (1923b) figures of one of the two Paris syntypes (actually the larger one, MNHN 01-260) do show a dark posterior half of the pectoral fin (Figs. 1,2) and a darker area in front of the pectoral base (Figs. 1-3), though in Figure 3 the pigmentation of the free edge of the pectoral was omitted, presumably so that the pectoral rays could be shown.

Pellegrin's description of the color of *H. digueti* does not therefore exactly fit the illustration, perhaps because the color was being described in general terms, rather than in detail. This uncertainty was clarified when I was actually able to study the two syntypes. The illustration agrees closely with the larger syntype

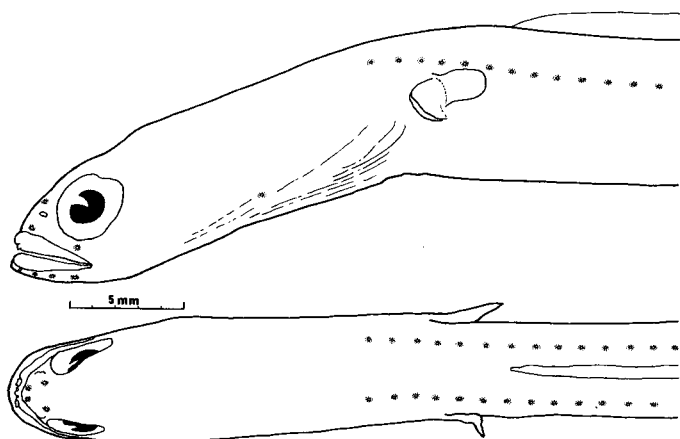


Figure 2. Holotype of *Heteroconger pellegrini*, LACM 32558-5, to show distribution of head pores.

and that is therefore here designated as the lectotype. It is generally nondescript light-tan in body color and has almost certainly decolorised, possibly as a result of long preservation, since the syntypes were collected at the turn of this century. It seems likely that they were in that condition even when Pellegrin described them some 20 yrs later, though the lectotype does show faint dark color on the pectoral region.

The smaller syntype of *H. digueti* (MNHN 01-261) is lightly speckled, without any dark pectoral color, which together with its slender body, identifies it with the new species of *Heteroconger* described here. Pellegrin's description is obviously a composite. Two species were therefore represented by the original collection at the island of Espiritu Santo in the Gulf of California by the then museum collector Léon Diguët, and must have been living more or less together in that location, as described in an addendum to Pellegrin's (1923b) account.

Radiographic examination of the garden eels studied, including particularly the syntypes of *H. digueti*, provided important vertebral information on variability of the species discussed in this paper. As well, it prompted a reappraisal of the known *Heteroconger* species in the eastern Pacific.

Heteroconger pellegrini new species (Figs. 1-2; Tables 1-2)

Taenioconger digueti Pellegrin, 1923 (in part). Pellegrin, 1923a: 789.

Holotype.—LACM 32558-5, 400 mm TL, Pacific Costa Rica. See material examined.

Paratypes.—LACM 32558-8, 155-379 mm TL (28), Pacific Costa Rica. USNM 316694, 442-626 mm TL (3), Mexico, Gulf of California. See material examined.

Diagnosis.—A species of *Heteroconger* having body coloration of minute closely-packed black speckles over light cream ground color, the fine speckles more dense dorsally and less dense along tail; vertebrae 177-192 (mean = 183.1). In eastern Pacific *diguëtii*, *canabus* and *klausewitzi* body color is tan to dark chocolate interrupted by light patches anteriorly with pectoral fin and branchial region very dark brown to black, vertebrae 174-199 but with dissimilar ranges and means in each of the species. In Indo-west Pacific and Atlantic species a variety of plain to distinctive spots or bands and different vertebral numbers, none exactly the same as in the new species.

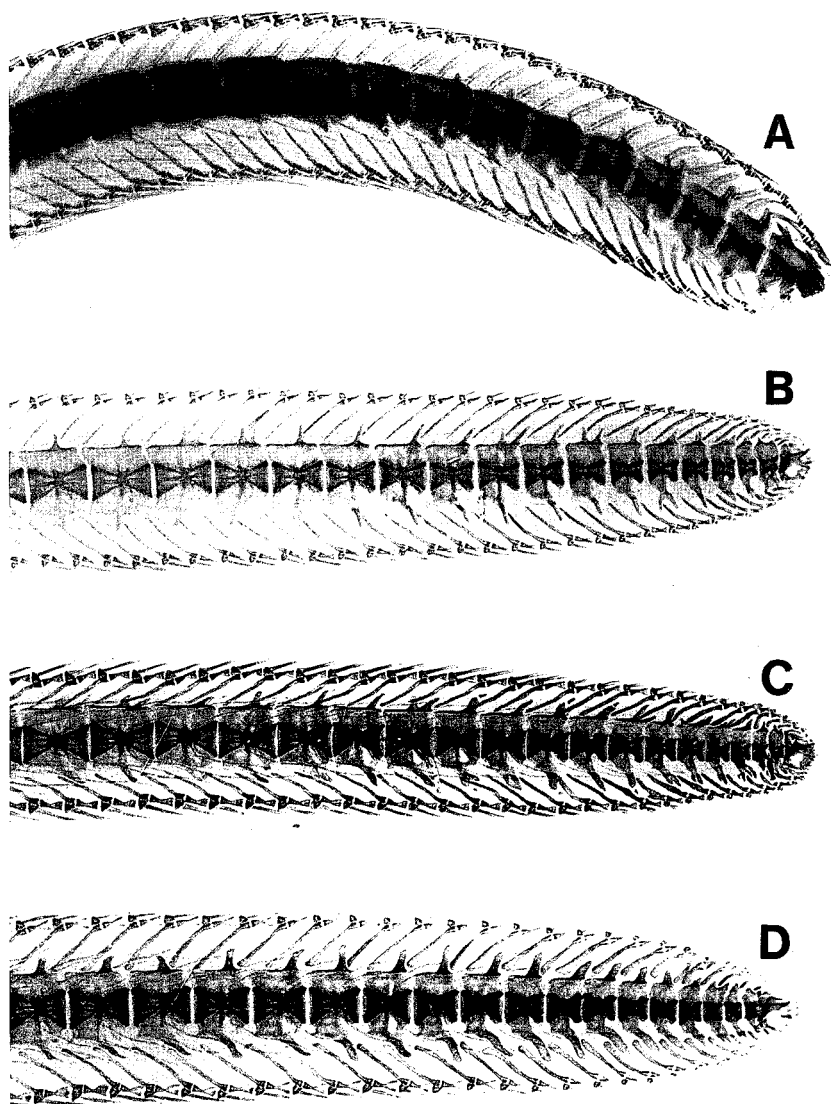


Figure 3. Caudal region skeletons of “digueti” type *Heteroconger* species, from radiographs. (A) *Heteroconger digueti*, lectotype, MNHN 01-260, 630 mm TL. (B) *H. digueti*, SIO 74-124, 572 mm TL. (C) *H. digueti*, SIO 65-278, 760 mm TL. (D) *H. klausewitzii*, SIO 77-192, 640 mm TL.

Counts and Measurements.—Given in mm for the holotype, followed by the paratypes. Vertebral formulae 8/56/180, 7-9/56-59/175-192; lateral line pores before pectoral 3, 2-4; lateral line pores before anus 51, 50-54; total lateral line pores 161, 152-166; pectoral rays 18, 16-19 (4 specimens); dorsal rays before level of anus 164, 143-198; total dorsal rays 623, 532-675; total anal rays 421, 350-478; caudal rays 8, 7-8; supraorbital pores 3, 3 (including ethmoid); infraorbital pores 2, 2; postorbital pores 0, 0; preoperculo-mandibular pores 4 + 1, 4 + 1; supra-

Table 1. Vertebral numbers of *Heteroconger pellegrini*.

	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197
<i>H. pellegrini</i>																								
LACM 32558-5 (Holotype) Costa Rica							1																	
LACM 32558-8 (Paratypes) Costa Rica		2	3	2	3	3	7	2	1	2	2													
USNM 316694 (Paratypes) Baja California																	1	1	1					
MNHN 01-261 (syntype of <i>H. digueti</i>) Baja California													1											

Table 2. Comparison of Baja California and Costa Rica *Heteroconger pellegrini*.

	Total vertebrae	Preal vertebrae	Postanal vertebrae	Postanal length (% TL)
USNM 316694 (3) (Baja California)	190–192	58–59	132–133	71.0–72.4
Mean	191.00	58.33	132.67	71.8
LACM 32558-8 (27) (Costa Rica)	175–184	54–58	119–128	67.6–70.2*
Mean	179.30	56.19	123.15	69.08

* 12 specimens only.

temporal pores 0, 0. As percent of total length: preanal 29.8, 27.6–32.4. As percent of preanal: predorsal 19.6, 16.9–20.8; head 16.6, 14.0–19.2. As percent of head: snout 12.2, 8.5–13.9; eye 21.8, 17.1–22.2; interorbital 10.7, 8.2–13.0; mouth 21.8, 19.5–22.4; branchial aperture 11.7, 7.8–12.7; branchial interspace 15.2, 13.4–20.7; pectoral 14.2, 10.6–19.7; depth at anus 22.8, 19.6–27.6.

General Description.—Body greatly elongate, slender, slightly compressed, more so near tail tip (Fig. 1A); greatest depth at gill openings, though tapering little until very near tail tip. Head little depressed or compressed (Fig. 1B), flexed slightly downwards in front of gill openings; snout very short, rounded, upper lip a well-developed flange turned back on anterior face of snout and confluent medially with upper lip of opposite side; anterior nostril a minute, forwardly-facing tube enclosed by upper lip near midline; posterior nostril a simple opening near anterodorsal corner of eye; lower jaw slightly projecting in front of upper and also with a well-developed lip turned back on face of lower jaw; mouth very oblique, reaching to below anterior margin of eye; eye relatively large, barely intruding into dorsal profile; throat with weak folds.

Gill opening slightly oblique, before and below pectoral base; pectoral fin a small rounded flap; dorsal origin appreciably behind tip of pectoral, the fin relatively low in the preserved material, confluent with a very abbreviated caudal fin; anal fin similar. Anus at end of anterior third of body.

Head pores inconspicuous (Fig. 2B), surrounded by unpigmented areas, each slightly raised above surface. Lateral line pores simple openings, complete until some distance before tail tip.

Teeth generally small, conical, slightly recurved, present on intermaxillary, vomer, maxillary and dentary (Fig. 2C). No pterygoid teeth. Teeth multiserial, but uniserial on posterior part of maxilla; intermaxillary teeth in a small patch continuous with vomerine patch, the anterior 2–3 teeth pointing forwards; vomerine teeth in a teardrop-shaped patch ending posteriorly in two uniserial teeth. Inner teeth on jaws larger than outer teeth, and pointing inwards.

Color in alcohol formed by minute black speckles so as to make body more or less uniformly dark, though darker above and anteriorly over a lighter background, lighter below and along caudal region; pectoral without speckles; upper and lower lips dusky.

Holotype a maturing male with testes developed as thin cream-colored structures alongside posterior end of gut.

Etymology.—Named for Jaques Pellegrin, French ichthyologist who described the first garden eels collected in the Gulf of California and subsequently brought back to Paris in 1900 by Léon Diguët. Though Pellegrin erred in not recognising that

Diguët's two specimens belonged to different species, it seems appropriate to recognise the describer's contribution to knowledge of the *Heterocongrinae*.

Remarks.—Tables 1 and 2 show the total numbers of vertebrae in the specimens from Baja California (USNM) and Costa Rica (LACM). Table 2 additionally compares the numbers of preanal (head and trunk) vertebrae, postanal ("tail") vertebrae and the tail lengths. The three paratypes from Baja California clearly have more vertebrae in each of these categories. The more numerous "tail" vertebrae in the northern specimens seems to be reflected in these having a slightly longer tail. However, the sample is too small to provide a statistical comparison. Specimens of *H. pellegrini* have not been captured in intervening localities between Baja California and Costa Rica but until these are sampled it is considered premature to make any formal taxonomic distinction between eels from the north and south.

HETEROCONGER DIGUËTI, RELATED SPECIES AND VERTEBRAL INFORMATION

LECTOTYPE OF *HETEROCONGER DIGUËTI*.—A radiograph of this specimen (MNHN 01-260, Fig. 3A) revealed that it has a malformed hypural complex, indicating that the caudal tip had regrown at some stage. Furthermore, the much smaller, shorter, terminal vertebrae characteristic of other specimens of the "diguëti" group of species, i.e., *H. diguëti* and *H. klausewitz* (Figs. 3B-D) are absent in the lectotype. In normal specimens the overall size of the last several vertebrae tapers off rapidly and they become much more compacted longitudinally; in the lectotype there is little reduction in size and little compaction of the penultimate vertebrae forward of the regrown hypural. Additionally, the neural and haemal spines of the penultimate several vertebrae are generally less well developed than in normal specimens and more like those of more anterior vertebrae. In consideration of these discrepancies between the lectotype and comparable sized specimens of *H. diguëti* and *H. klausewitz* it seems likely that 10-12 (and perhaps as many as 15) of the original vertebrae are missing from the lectotype and that the adjusted number should be 189-191 rather than 179 (Table 3). That being so, the vertebral range of the lectotype falls within that of *H. canabus*, i.e., 186-199, mean 191 given by Cowan and Rosenblatt (1974) as well as of the specimens referred to *H. diguëti* by these authors, i.e., 179-191, mean 185.

HOLOTYPE OF *HETEROCONGER HERREI*.—Cowan and Rosenblatt (1974) referred this small specimen to *H. diguëti*. They viewed the differences perceived by Wade (1946) between the two species leading him to describe *H. herrei* as distinct from *H. diguëti*, as simply a function of the discrepancy in size of the holotype (145 mm TL) and the syntypes of *H. diguëti* (530 mm and 630 mm TL). I wholly agree, but note further that the same could also be said of the differences between the holotype and both *H. canabus* and *H. klausewitz*. My examination of the holotype showed it to have a dark pectoral, dusky lips and 189 vertebrae, again within the stated ranges for *H. canabus* and *H. diguëti* (Table 3). *Heteroconger herrei* therefore cannot be definitively identified with one or other of the two species, contrary to Cowan and Rosenblatt's (1974) view that it should be referred to *H. diguëti*. It is unlikely to be *H. klausewitz* because of its high vertebral count. *H. herrei* should consequently be listed as *Heteroconger* sp. *incertae sedis* at least until the question of the synonymy, or otherwise, of *H. canabus* with *H. diguëti* is resolved (see below). Incidentally, my examination of the snout region of the holotype did, with great difficulty because of the small size of the specimen and some damage in that area, reveal minute, tubular anterior nostrils and an

Table 3. Vertebral numbers of East Pacific *Heteroconger*.

	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197
<i>H. digueti</i>																								
MNHN 01-260 (Lectotype)																	*							
Baja California																								
SIO 62-271																		1				1		
Baja California																								
SIO 65-278																	1		1					
Baja California																								
SIO 74-124																	1						1	
Baja California																								
<i>H. herrei</i>																								
LACM 21697 (Holotype)																	1							
Baja California																								
<i>H. canabus</i>																								
SIO 61-261-26A (Holotype)																					1			
Baja California																								
SIO 61-261-26B (Paratypes)													1		2	2	2	1	2	1		1	1	
Baja California																								
<i>H. klausewitzii</i>																								
SIO 77-192																								
Galapagos						1						1												
CAS specimens	1			1	2		3	1		1														
Galapagos																								
LACM uncatalogued				1		1					1													
Isla Coco																								
LACM 32558-6			1	4	1	2		1		1														
Costa Rica																								

* Adjusted total estimated to be within this range.

ethmoid pore medial to each of them. These structures were not located by either Wade (1946) or Cowan and Rosenblatt (1974).

OTHER SPECIMENS.—Ten “digueti”-type specimens from Pacific waters off Costa Rica identified as that species (LACM 32558–6) had vertebral counts matching *H. klausewitzii* (Table 3) and other than being lighter in body color, could not be distinguished from that species. Six specimens, also of the “digueti” type and labelled as that species from the Gulf of California (SIO 68–271, 65–278, 74–124) had vertebral counts matching those of *H. canabus* rather than *H. digueti*, as determined by Cowan and Rosenblatt (1974). These authors compared their species *H. canabus* with *H. digueti* and found differences in body color, vertebral number, lateral line pore counts and morphometrics. Having examined several paratypes of *H. canabus* and some of the *H. digueti* described by those authors, I agree in respect of body color (darker in *H. canabus*) but my counts of vertebrae in *H. digueti* do not wholly agree since they are within the range given both for the type material of *H. canabus* 186–199 by Cowan and Rosenblatt (1974) and my own observations (from a smaller sample of the paratypes) (Table 3). These inconsistencies highlight the difficulty of distinguishing between the two species and brings into question the validity of *H. canabus*. Though Cowan and Rosenblatt gave morphometric details of 180 specimens (presumably) of *H. canabus* no comparative figures were given for *H. digueti* so their conclusions in respect of this character cannot be readily evaluated. *Heteroconger canabus* is said to have more lateral line pores and vertebrae than *H. digueti*, is more slender bodied, has its dorsal origin more anteriorly placed and has a shorter head than *H. digueti*. However, in specimens of *H. digueti* with more vertebrae such differences might also be expected. As shown for *H. pellegrini*, the specimens with more vertebrae have a slightly longer tail, i.e., have the anus placed further forwards but because the number of “long tailed” specimens of the new species from Baja California are so few I have not taken this analysis further in respect of other morphometric characters.

CONCLUSIONS

There is a general, and well enough known similarity in body color of eastern Pacific garden eels of the “digueti”-type, ranging from light tan in *H. digueti* itself through to darker brown and dark chocolate in *H. canabus* and *H. klausewitzii*, though smaller individuals (and occasional others) of all species can be very light colored. That, coupled with the lack of any readily observable morphological differences between them explains the uncertainty that has surrounded the identification of these species, and accounts for small specimens being misidentified from time to time.

The currently held view is that there are three species of the “digueti” type in the eastern Pacific. *Heteroconger digueti*, the first to be described, is generally light tan in body color, with well developed white patches anteriorly and an almost black pectoral area. It matures at around 600 mm TL or less and is known from Baja California. *Heteroconger canabus* is dark tan to chocolate with some lighter areas anteriorly; it apparently has rather more vertebrae than *H. digueti*, matures at least at 800 mm TL and is so far known also only from Baja California. Apart from the difference in body color its distinction from *H. digueti* is not very clear. Cowan and Rosenblatt (1974) did distinguish between the two on vertebral counts and morphometrics, but the vertebral evidence has not been confirmed in this study. *Heteroconger klausewitzii* is dark chocolate in adults, though much lighter in juveniles, with well developed white patches and dark pectoral area anteriorly,

maturing at 600–900 mm TL and is known from Costa Rica to Galápagos. *Heteroconger herrei* cannot be definitively identified with either *H. digueti* or *H. canabus*.

An alternative interpretation of the situation is that there is just one variable species, *H. digueti*, which is characterized generally by low vertebral number and darkest body color in adults of the most southern population (*H. klausewitzii*, Galápagos) and high vertebral number and light body color to the north (*H. digueti*, including *H. herrei*, Baja California). *Heteroconger canabus*, with “klausewitzii” color and “diguetti” vertebral count and Costa Rica juveniles of *H. klausewitzii* with “klausewitzii” vertebral number but “diguetti” color would thus be viewed as intermediates in such a scheme. The similarity of color pattern in juveniles of *H. digueti* and *H. klausewitzii*, and the lack of juveniles and attested adults of *H. canabus* confounds the problem of identification.

Less radical is the possibility that *canabus* is the same as *diguetti* while *klausewitzii* is distinct from these.

The limited access that I have had to additional material has not allowed me to resolve the above issues. The difficulties of separating the “diguetti” type species on external characters alone (especially juveniles) and the new information on vertebral counts presented here are sufficient reasons to suggest that a more comprehensive study of these garden eels is warranted. Apart from the matter of species distinctness, the main questions that arise are whether the *Heteroconger* species of the eastern Pacific occur continuously along the coast of Mexico southwards from Baja California to Costa Rica and the Galápagos and if so whether the “high count” populations in the north intergrade with the “low count” populations in the south. Alternatively, if the differences in vertebral numbers between eels from the north and south are real and consistent, what biogeographical significance might this have?

MATERIAL EXAMINED

Heteroconger pellegrini: LACM 32558–5, 1(400 mm TL, holotype), Pacific Costa Rica, Puntarenas, Isla del Caño, north side of island, chemfish, pronoxfish, handnets, 20 m (coarse and fine sand), 17 March 1972, Wheeler, Bussing, Murillo, Rosenblatt, McCosker. LACM 32558–8, 28(155–379 mm TL, paratypes), same data as holotype. USNM 316694, 3(442–626 mm TL), Pacific Mexico, Baja California, Los Frailes, near Cabo Pulmo, 23°28'N, 109°25'W, Allen/STRI Eastern Pacific Collection, Station TEP–61, rotenone, 15 m (sand), 2 July, 1990, G. R. Allen and D. R. Robertson. MNHN 01–261, 1(530 mm TL, syntype of *Taenioconger digueti*), Pacific Mexico, Baja California, Espirito Santo Island, 2 m (sand).

Heteroconger klausewitzii: CAS 39264, 1 (598 mm TL), Ecuador, Galápagos Islands, Marchena, northeastern anchorage, 15 m, 8 March 1977, J. E. McCosker and others. CAS 39330, 1 (430 mm TL), Ecuador, Galápagos Islands, Floreana, Devil's Crown, 24 m, 5 March 1977, J. E. McCosker and R. R. Warner. CAS 39335, 2(545–553 mm TL), Ecuador, Galápagos Islands, Plazas Island Channel, quinaldine, 9 m (sand and some rock), 2 March 1977, J. E. McCosker. CAS 39336, 2(580–621 mm TL), Ecuador, Galápagos Islands, Plazas Island, Ships' Anchorage, 9 m, 3 March 1977, J. E. McCosker, L. R. Taylor, R. R. Warner. CAS 39400, 1(523 mm TL), Ecuador, Galápagos Islands, San Salvador Island, north edge of Buccaneer Cove, 30 m (sand and rock), 8 March 1977, J. E. McCosker. CAS 39419, 2(642–643 mm TL), Ecuador, Galápagos Islands, Bartolome, southeastern rock, 20 m, 11 March 1977, J. E. McCosker. SIO 77–192, 2(632–645 mm

TL), Galápagos Islands, Plazas Island, Ships' Anchorage, 9 m, 3 March 1977, J. E. McCosker, L. R. Taylor, R. R. Warner. LACM, 10(254–358 mm TL), Pacific Costa Rica, Puntarenas, Isla del Caño, north side of island, chemfish, pronoxfish, handnets, 20 m (sand), 17 March 1972, Wheeler, Bussing, McCosker. LACM uncatalogued, 3(118–178 mm TL), Costa Rica, Isla del Coco, 7 February 1993.

Heteroconger digueti: MNHN 01–260, 1(630 mm TL, syntype of *Taenioconger digueti*, here designated as the lectotype), Pacific Mexico, Baja California, Isla Espiritu Santo, 2 m (sand). SIO 62–271, 2(434 & 502 mm TL), Mexico, Baja California Sur (Gulf of California side), Los Frailes Bay, chemfish special, 18–23 m, sand, 29 May 1962, J. R. Stewart. SIO 65–278, 2(730 & 761 mm TL), Mexico, Baja California Sur (Gulf of California side), Canal de San Jose, 24° 59.75'N, 110° 46'W, chemfish, 26–34 m, fine sand and shell, 9 July 1965 (09:30–11:30), R. Rosenblatt and party. SIO 74–124, 2(573 & 675 mm TL), Mexico, Isla Santa Cruz, rotenone, 6–9 m, rocks, sand and gravel, 22 March 1974 (10:15–12:45), R. Rosenblatt.

Heteroconger canabus: SIO 61–261–16B, 14(305–635 mm TL, paratypes), Pacific Mexico, Baja California, west coast Isla Cerralvo, 24°18.85'N, 109°55.5'W, 22 June 1961.

Heteroconger herrei: LACM 21697, 1(145 mm TL, holotype of *Taenioconger herrei*), Pacific Mexico, Baja California, Isla San Francisco, AHF Expedition stat. 516–36 dredge, 38–46 m, 25 February 1936, (original catalog number AHF 904).

METHODS AND ABBREVIATIONS.—Total length (TL) is used throughout because that differs little from standard length. Vertebral formulae follow the system of Böhlke (1982) except that a slash instead of a dash is used to separate predorsal, preanal and total numbers; the hypural is included as part of the total. Institutional acronyms are as given in Leviton et al. (1985).

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